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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/401,676	09/22/1999	HENRY ESMOND BUTTERWORTH	UK999-027	4983

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EXAMINER	
LAFORGIA, CHRISTIAN A	
ART UNIT	**PAPER NUMBER**
2131	

DATE MAILED: 11/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/401,676	BUTTERWORTH ET AL.	
	Examiner	Art Unit	
	Christian La Forgia	2131	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 August 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. The amendment of 22 August 2005 has been noted and made of record.

2. Claims 1-14 have been presented for examination.

Response to Arguments

3. Applicant's arguments filed 22 August 2005 have been fully considered but they are not persuasive.

4. Applicant's arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references.

5. See further rejections that follow.

Claim Rejections

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claims 1-3, 5-7, and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,414,858 to Hoffman et al., hereinafter Hoffman, in view of Applicant's Admitted Prior Art, hereinafter AAPA.

8. As per claims 1, 5, and 10, Hoffman discloses a method for varying between an interrupt service and a polling service (column 2, lines 2-14).

According to page 1 of the Applicant's "Background of the Invention," each hardware device signals that there is work for the software to do by asserting an interrupt line which causes the software flow-of-control to be diverted to an interrupt handler which handles the interrupt. The "Background of the Invention" goes on to state that an interrupt is typically handled by

masking (or disabling) the interrupt and scheduling a task for later execution which will service the requesting device. Therefore, since Hoffman discloses the use of an interrupt service, generating an interrupt in response to receipt of a work item, disabling system interrupts, scheduling a task through the generated interrupt for processing of the item, and executing the task to process the work item are disclosed by the Hoffman reference.

Hoffman discloses processing additional work items received by the system (column 2, lines 15-34, i.e. tracking the rates of service requests); and

when there are no additional work items for processing, speculatively scheduling a further task for processing of subsequently received work items in the system, without enabling system interrupts (column 2, lines 15-34, i.e. when a certain threshold is reached the system switches from interrupt service mode to polling service mode).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to disable interrupts and use a polling system during times of increased usage, since the AAPA states at pages 2 lines 1-14 that using an interrupt service mode when utilization is high is inefficient because of the increased interrupt overhead.

9. Regarding claims 2, 6, and 11, Hoffman teaches executing the speculatively scheduled task to process any work items received by the system (column 1, lines 33-43, column 2, lines 15-34, column 3, lines 21-51, i.e. polling interrupt lines);

enabling system interrupts when no additional work items have been received by the system when the speculatively scheduled task is executed (column 2,lines 15-34, column 3, lines 39-51, i.e. reverting to interrupt service mode).

As disclosed above, Hoffman and the "Background of the Invention" disclose interrupt processing, thereby disclosing processing one or more work items when at least one work item has been received by the system when the speculatively scheduled task is executed, and speculatively scheduling an additional further task for processing of subsequently received work items after processing the one or more work items, without enabling system interrupts.

10. With regards to claims 3 and 7, Hoffman discloses an interrupt system and AAPA discusses that the interrupt is scheduled for later execution, which one of ordinary skill in the art would recognize as being work items managed on a queue.

11. Regarding claims 4 and 8, AAPA discusses scheduling tasks for later execution, thereby disclosing wherein the event that further work items are received after the task is scheduled and prior to execution of the task, the step of executing the task comprises processing all the received work items.

12. Regarding claim 9, Hoffman teaches the interrupt generating means and processing means are embodied in a data storage controller and the work items comprise data transfer requests from an attached host system (column 2, line 50 to column 3, line 20).

13. Claims 12-14 are rejected under both 35 U.S.C. 102(a) and 35 U.S.C. 102(e)(2) as being anticipated by U.S. Patent No. 5,933,598 to Scales et al., hereinafter Scales.

14. As per claim 12, Scales teaches a new method of processing work items in a data processing system, comprising:

effectively providing an interrupt-based mechanism for processing work items, when the system utilization is low with respect to work items (column 13, lines 60-65); and,

effectively providing a polling-based mechanism for processing work items, when system utilization is relatively high with respect to work items (column 13, line 45 to column 14, line 13).

15. With regards to claim 13, Scales teaches wherein work item are received in accordance with at least one device driver associated with a host system (column 3, lines 3-30, i.e. workstations sharing resources in a shared environment, "programs executing on any of the workstations").

16. Regarding claim 14, Scales teaches wherein the data processing system comprises a storage controller (column 3, liens 6-23, column 4, lines 28-58).

Double Patenting

17. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application

claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., In re Berg, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); In re Goodman, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); In re Longi, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); In re Van Ornum, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); In re Vogel, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and In re Thorington, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

18. A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

19. Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

20. Claims 12-14 are rejected on the ground of nonstatutory double patenting over claims 1-15 of U. S. Patent No. 5,414,858 since the claims, if allowed, would improperly extend the "right to exclude" already granted in the patent.

21. The subject matter claimed in the instant application is fully disclosed in the patent and is covered by the patent since the patent and the application are claiming common subject matter, as follows:

Claim 12 of the instant application a method of processing work items in a data processing system, comprising:

effectively providing an interrupt-based mechanism for processing work items, when the system utilization is low with respect to work items; and,

effectively providing a polling-based mechanism for processing work items, when system utilization is relatively high with respect to work items.

Claims 1, 7, and 12 disclose a method for managing service requests from a group of peripherals connected to a data processor, comprising the steps of:

operating the system in a first mode of servicing the group of peripherals responsive to interrupt type service requests generated by one or more peripherals of the group;

operating the system in a second mode of servicing the group of peripherals involving a polling of one or more peripherals of the group for service requests; and

transitioning between the first mode of servicing the group of peripherals and the second mode of peripherals responsive to changes in the time related rate at which service requests are generated by the group of peripherals.

Claims 2, 8, and 13 teach wherein the system transitions from the first mode [interrupts] to the second mode [polling] upon an increase in the rate of service requests [system utilization is high].

Claims 3, 9, and 14 disclose wherein the system operates in the first mode [interrupts] during low rates of service requests [system utilization is low].

22. Furthermore, there is no apparent reason why applicant was prevented from presenting claims corresponding to those of the instant application during prosecution of the application which matured into a patent. See *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968). See also MPEP § 804.

Conclusion

23. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

24. The following patents are cited to further show the state of the art with respect to interrupt processing, such as:

United States Patent No. 6,594,698 to Chow et al., which is cited to show interrupt processing on column 14, lines 48-63.

25. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

26. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

27. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christian La Forgia whose telephone number is (571) 272-3792. The examiner can normally be reached on Monday thru Thursday 7-5.

28. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ayaz Sheikh can be reached on (571) 272-3795. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

29. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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11/14/05